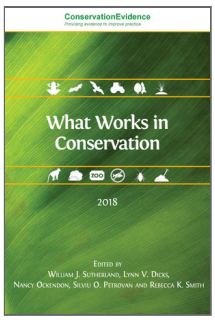

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5.10 Habitat restoration and creation

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5.10 Habitat restoration and creation

5.10.1 Restoration after wildfire

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for restoration after wildfire?	
Trade-offs between benefit and harms	• Thin trees after wildfire
Unknown effectiveness (limited evidence)	• Remove burned trees
Likely to be ineffective or harmful	• Sow tree seeds after wildfire
No evidence found (no assessment)	• Plant trees after wildfire

Trade-off between benefit and harms

Thin trees after wildfire

Four of five replicated, controlled studies in Spain, Israel, Cananda and the USA found that thinning trees in burnt forest areas increased plant species richness, cover or survival of saplings. One study found thinning decreased plant biomass. One paired-site study in Canada found that logging after wildfire decreased species richness and diversity of mosses. *Assessment: trade-offs between benefits and harms (effectiveness 50%; certainty 50%; harms 38%).*

http://www.conservationevidence.com/actions/1234

Unknown effectiveness (limited evidence)

Remove burned trees

Two replicated, controlled studies in Israel and Spain found that removing burned trees increased total plant species richness or the cover and species richness of some plant species. *Assessment: unknown effectiveness (effectiveness 60%; certainty 20%; harms 25%).*

http://www.conservationevidence.com/actions/1237

Likely to be ineffective or harmful

Sow tree seeds after wildfire

Three studies, including one replicated, randomized, controlled study, in the USA found that sowing herbaceous plant seeds in burnt forest areas decreased the density of tree seedlings or the number and cover of native species. All three found no effect of seeding on total plant cover or species richness. *Assessment: likely to be ineffective or harmful (effectiveness 0%; certainty 43%; harms 40%).*

http://www.conservationevidence.com/actions/1236

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Plant trees after wildfire

5.10.2 Restoration after agriculture

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for restoration after agriculture?	
Unknown effectiveness (limited evidence)	• Restore wood pasture (e.g. introduce grazing)

Unknown effectiveness (limited evidence)

Restore wood pasture (e.g. introduce grazing)

One replicated paired study in Sweden found that partial harvesting in abandoned wood pastures increased tree seedling density, survival and growth. *Assessment: unknown effectiveness (effectiveness 65%; certainty 25%; harms 0%).*

http://www.conservationevidence.com/actions/1164

5.10.3 Manipulate habitat to increase planted tree survival during restoration

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for manipulating habitat to increase planted tree survival during restoration?	
Unknown effectiveness (limited evidence)	• Apply herbicides after restoration planting • Cover the ground using techniques other than plastic mats after restoration planting • Cover the ground with plastic mats after restoration planting • Use selective thinning after restoration planting

Unknown effectiveness (limited evidence)

Apply herbicides after restoration planting

One replicated, randomized, controlled study in the USA found that controlling vegetation using herbicides after restoration planting decreased plant species richness and diversity. *Assessment: unknown effectiveness (effectiveness 45%; certainty 25%; harms 40%).*

http://www.conservationevidence.com/actions/1241

Cover the ground using techniques other than plastic mats after restoration planting

One replicated, randomized, controlled study in the USA found that covering the ground with mulch after planting increased total plant cover. *Assessment: unknown effectiveness (effectiveness 30%; certainty 15%; harms 10%).*

http://www.conservationevidence.com/actions/1240

Cover the ground with plastic mats after restoration planting

One replicated study in Canada found that covering the ground with plastic mats after restoration planting decreased the cover of herbecous plants and grasses. *Assessment: unknown effectiveness (effectiveness 40%; certainty 20%; harms 0%).*

http://www.conservationevidence.com/actions/1239

Use selective thinning after restoration planting

One replicated, paired sites study in Canada found that selective thinning after restoration planting conifers increased the abundance of herbaceous species. *Assessment: unknown effectiveness (effectiveness 43%; certainty 18%; harms 0%).*

http://www.conservationevidence.com/actions/1238

5.10.4 Restore forest community

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for restoring a forest community?	
Unknown effectiveness (limited evidence)	• Build bird-perches to enhance natural seed dispersal • Plant a mixture of tree species to enhance diversity • Sow tree seeds • Water plants to preserve dry tropical forest species
No evidence found (no assessment)	• Restore woodland herbaceous plants using transplants and nursery plugs • Use rotational grazing to restore oak savannas

Unknown effectiveness (limited evidence)

Build bird-perches to enhance natural seed dispersal

One replicated, randomized, controlled, before-and-after study in Brazil found that sowing tree seeds increased the density and species richness of new trees. *Assessment: unknown effectiveness (effectiveness 50%; certainty 13%; harms 0%).*

http://www.conservationevidence.com/actions/1245

Plant a mixture of tree species to enhance diversity

One replicated, randomized, controlled study in Brazil found that planting various tree species increased species richness, but had no effect on the density of new trees. One replicated, controlled study in Greece found that planting native tree species increased total plant species richness, diversity and cover. *Assessment: unknown effectiveness (effectiveness 50%; certainty 28%; harms 0%).*

http://www.conservationevidence.com/actions/1243

Sow tree seeds

One replicated, randomized, controlled, before-and-after study in Brazil found that sowing tree seeds increased the density and species richness of new trees. *Assessment: unknown effectiveness (effectiveness 60%; certainty 13%; harms 0%).*

http://www.conservationevidence.com/actions/1244

Water plants to preserve dry tropical forest species

One replicated, controlled study in Hawaii found that watering plants increased the abundance and biomass of forest plants. *Assessment: unknown effectiveness (effectiveness 65%; certainty 18%; harms 0%).*

http://www.conservationevidence.com/actions/1242

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Restore woodland herbaceous plants using transplants and nursery plugs
- Use rotational grazing to restore oak savannas

5.10.5 Prevent/encourage leaf litter accumulation

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for preventing/encouraging leaf litter accumulation?	
Unknown effectiveness (limited evidence)	• Remove or disturb leaf litter to enhance germination
No evidence found (no assessment)	• Encourage leaf litter development in new planting

Unknown effectiveness (limited evidence)

Remove or disturb leaf litter to enhance germination

One of two replicated, controlled studies in Poland and Costa Rica found that removing leaf litter increased understory plant species richness. The two studies found that removal decreased understory plant cover or the density of new tree seedlings. *Assessment: unknown effectiveness (effectiveness 40%; certainty 25%; harms 23%).*

http://www.conservationevidence.com/actions/1246

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Encourage leaf litter development in new planting

5.10.6 Increase soil fertility

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for increasing soil fertility?	
Likely to be beneficial	• Use vegetation removal together with mechanical disturbance to the soil
Trade-offs between benefit and harms	• Add organic matter • Use fertilizer • Use soil scarification or ploughing to enhance germination

Unknown effectiveness (limited evidence)	• Add lime to the soil to increase fertility • Use soil disturbance to enhance germination (excluding scarification or ploughing)
Likely to be ineffective or harmful	• Enhance soil compaction

Likely to be beneficial

Use vegetation removal together with mechanical disturbance to the soil

Three studies, including one replicated, randomized, controlled study, in Portugal and France found that vegetation removal together with mechanical disturbance of the soil increased the cover or diversity of understory plants, or density of young trees. One of the studies found it decreased understory shrub cover. *Assessment: Likely to be beneficial (effectiveness 61%; certainty 40%; harms 15%).*

http://www.conservationevidence.com/actions/1274

Trade-off between benefit and harms

Add organic matter

One of two studies, including one replicated, randomized, controlled study, in Brazil and Costa Rica found that adding leaf litter increased species richness of young trees. One found it decreased young tree density in artificial forest gaps and both found no effect on the density of tree regenerations under intact forest canopy. One of two replicated, controlled study in Portugal and the USA found that adding plant material increased total plant cover. One found mixed effects on cover depending on plant group. *Assessment: trade-offs between benefits and harms (effectiveness 45%; certainty 43%; harms 28%).*

http://www.conservationevidence.com/actions/1250

Use fertilizer

Six of eight studies, including five replicated, randomized, controlled, in Europe, Brazil, Australia and the USA found that applying fertilizer

increased total plant cover, understory plant biomass, size of young trees, biomass of grasses or cover of artificially seeded plant species. Five of the studies found no effect on plant biomass, cover, seedling abundance, tree growth or tree seedling diversity. *Assessment: trade-offs between benefits and harms (effectiveness 55%; certainty 65%; harms 25%).*

http://www.conservationevidence.com/actions/1248

Use soil scarification or ploughing to enhance germination

Two studies, including one replicated, randomized, controlled study, in Portugal and the USA found that ploughing increased the cover or diversity of understory plants. Two of five studies, including two replicated, randomized, controlled, in Canada, Brazil, Ethiopia and Sweden found that ploughing increased the density of young trees. One found a decrease in density and two found mixed effects depending on tree species. One replicated, before-and-after trial in Finland found that ploughing decreased the cover of plants living on wood surface. One replicated, controlled study in the USA found that ploughing did not decrease the spreading distance and density of invasive grass seedlings. *Assessment: unknown effectiveness (effectiveness 60%; certainty 50%; harms 25%).*

http://www.conservationevidence.com/actions/1251

Unknown effectiveness (limited evidence)

Add lime to the soil to increase fertility

One replicated, randomized controlled study in the USA found that adding lime increased vegetation cover. *Assessment: unknown effectiveness (effectiveness 80%; certainty 18%; harms 0%).*

http://www.conservationevidence.com/actions/1249

Use soil disturbance to enhance germination (excluding scarification or ploughing)

Two replicated, controlled studies in Canada and Finland found that disturbance of the forest floor decreased understory vegetation cover. *Assessment: unknown effectiveness (effectiveness 30%; certainty 35%; harms 40%).*

http://www.conservationevidence.com/actions/1252

Likely to be ineffective or harmful

Enhance soil compaction

Two of three studies, including two replicated, randomized, controlled studies in Canada and the USA found that soil compaction increased understory plant cover and density. Two found it decreased tree regeneration height or density and understory plant species richness. *Assessment: likely to be ineffective or harmful (effectiveness 28%; certainty 40%; harms 45%).*

http://www.conservationevidence.com/actions/1253